

CLAIMS

What is claimed is:

- 5 1. A reconfigurable laser transmitter comprising:
 a gain element having an optical output;
 a first optical path receiving optical output from said gain element;
 a tunable microresonator optically coupled with said first optical path;
 a second optical path coupled with said tunable microresonator; and
 a fixed grating coupled with said second optical path.
- 10 2. The reconfigurable laser transmitter of claim 1 further comprising an
integration platform and wherein said gain element, said first optical path, said tunable
microresonator, said second optical path, and said fixed grating are integrated with said
integration platform.
- 15 3. The reconfigurable laser transmitter of claim 1 wherein said tunable
microresonator comprises a microdisk or a Fabry-Perot etalon.
4. The reconfigurable laser transmitter of claim 3 wherein said microdisk is
20 heterogeneously integrated with said integration platform.
5. The reconfigurable laser transmitter of claim 1 wherein said fixed grating
is fabricated in a material having a temperature sensitivity less than or equal to $0.1 \text{ }^{\circ}\text{C}/\text{Å}$.
- 25 6. The reconfigurable laser transmitter of claim 1 wherein said tunable
microresonator is electrically tuned.
7. The reconfigurable laser transmitter of claim 1 wherein said tunable
microresonator is vernier tuned.

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8. The reconfigurable laser transmitter of claim 1 wherein said fixed grating is a sampled grating.

9. The reconfigurable laser transmitter of claim 1 wherein the gain element is a laser and wherein the fixed grating is a sample grating having Bragg reflection peaks
5 for locking the laser thereto.

10. A method for reconfiguring a wavelength of a laser comprising the steps of:

coupling a tunable microresonator having a passband to a fixed grating having a plurality of reflection peaks; and

10 tuning said tunable microresonator such that the passband of said tunable microresonator is aligned with one of said plurality of reflection peaks of said fixed grating.

11. The method of claim 10 wherein said tunable microresonator is a
15 microdisk or a Fabry-Perot etalon.

12. The method of claim 10 further comprising the step of heterogeneously integrating said tunable microresonator with an integration platform.

20 13. The method of claim 10 where said step of tuning is done electrically.

14. The method of claim 10 wherein said fixed grating is fabricated in a material having a temperature sensitivity less than or equal to $0.1 \text{ }^{\circ}\text{C}/\text{Å}$.

25 15. The method of claim 10 wherein said fixed grating is a sampled grating.

16. The method of claim 10 wherein said step of tuning is vernier tuning.

17. A method of configuring a transmitter to transmit one of a plurality of
30 wavelengths, said method comprising the steps of:

passing a spectrum of light from a gain element into a tunable microresonator;

selecting a first portion of said spectrum of light to be transmitted by said transmitter; and

electrically tuning said tunable microresonator, wherein a second portion of said spectrum of light is to be transmitted by said transmitter.

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18. The method of claim 17 wherein said tunable microresonator is a microdisk or a Fabry-Perot etalon.

19. The method of claim 17 wherein said step of electrically tuning further
10 comprises the step of vernier tuning.

20. The method of claim 17 wherein the step of selecting a first portion further comprises the step of coupling a fixed optical grating to said tunable microresonator.

15 21. The method of claim 20 wherein said fixed optical grating is a sampled grating.

22. The method of claim 17 wherein the step of selecting a first portion further comprises the step of coupling a fixed optical-resonator filter to said tunable
20 microresonator.

23. The method of claim 17 wherein said spectrum of light corresponds to predetermined frequencies set according to an international standard.